

## **AC 2010-1906: FIRST-YEAR STUDENT EXPERIENCES, ATTITUDES AND OUTCOMES IN A SEMINAR ON INNOVATION AND ENTREPRENEURSHIP**

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# **First-Year Student Experiences, Attitudes and Outcomes in a Seminar on Innovation and Entrepreneurship**

## **Abstract**

This paper reports on experiences, attitudes and outcomes of first-year students who have completed a one credit-hour seminar entitled "*Innovation and Entrepreneurship: Rocket Fuel for Creative Minds*". Although the seminar is open to all first-year students at Ohio State University, it primarily attracts engineering and business students.

This paper more fully describes the structure of the *Rocket Fuel Seminar* and presents selected responses of students to surveys recorded at the end of each seminar offering. The survey results clearly indicate that engineering and business students are both attracted to and motivated by entrepreneurial learning opportunities very early in their college careers.

## **Introduction**

There is ongoing discussion among engineering educators regarding whether or not engineering students should be exposed to business subjects in order to better prepare them for engineering careers.<sup>1</sup> And, if so, what would be the best way to integrate such material into the traditional engineering curriculum? The issue of teaching entrepreneurship (how to start a company) to engineering students is even more complex, since few engineering faculty have had actual startup experiences and only a small percentage of engineering graduates will go on to start their own company sometime during their career.

And yet, engineering students as a group seem to have a high degree of curiosity about innovation (conceiving, creating and commercializing new products) and entrepreneurship. This attitude is confirmed in our experience of teaching the freshman seminar on Innovation and Entrepreneurship.

Another interesting element to the question of why and how to teach entrepreneurship to engineers lies in the fact that the globalization of entire markets is forcing traditional industries to become much more entrepreneurial in their operations and business development strategies.<sup>2</sup> Indeed, the dramatic reduction in design cycle times and product lifetimes are forcing product designers to become much more agile and market-smart—just to remain competitive.

## **The Freshman Seminar Program at Ohio State University**

In the freshman seminar program at Ohio State University, one and two credit-hour seminars are taught on a wide range of scholarly subjects by senior faculty representing diverse academic areas of the university. Faculty are invited to propose seminar topics within their area of expertise and seminar proposals are reviewed and approved by a multidisciplinary committee.

The seminars are open only to first-year students and have an enrollment limit of eighteen. They are designed to allow freshmen to connect with senior faculty in a seminar/discussion setting. The freshman seminars are administered within the College of Arts and Sciences as a multidisciplinary program. See <http://freshmanseminars.osu.edu>. Each year, roughly 15% of the freshman class of 7,000 students enrolls in one or more of the 70 seminars offered.

### **Freshman Seminar on Innovation and Entrepreneurship**

In Autumn 2005, one of the authors (Schlosser) developed and began teaching a freshman seminar entitled "*Innovation and Entrepreneurship: Rocket Fuel for Creative Minds*". Some aspects of the seminar are based on his two decades of business experience outside of academia, including leading three successful startup companies.

Whereas most freshman seminars are taught only once each year, the *Rocket Fuel Seminar* (as it is tagged) has been taught every quarter since its introduction. Student demand creates a full enrollment each quarter, with a waiting list. It has been, by a wide margin, taken by more students than any other seminar in the program, having been taught 15 times, with a total enrollment of over 250 students.

Since its introduction, the profile (with respect to major programs) of students who enroll each quarter has remained relatively constant — roughly 50% are engineering students, 40% business students, and 10% students with other majors. The number of first-year engineering students at Ohio State is approximately 30% greater than the number of first-year business students. Therefore, the enrollment numbers indicate that first-year engineering students are just as interested in learning about innovation and entrepreneurship as are freshman business students.

The *Rocket Fuel Seminar* is a one credit-hour course that meets once each week for 48 minutes. Letter grades are based on the following weights: 35% for written summaries of reading assignments, 35% for a case study and oral presentation, and 30% for attendance and participation in discussions.

Weekly readings are assigned from a variety of sources, mostly from works by business authors, including Clayton Christensen, *The Innovator's Dilemma*<sup>3</sup>, Geoffrey Moore, *Crossing the Chasm*<sup>4</sup>, and Jim Collins, *Good to Great*<sup>5</sup>. Students write a brief summary of the week's reading assignment, submit their summaries online prior to that week's class, and come to class prepared to discuss the assigned reading. The instructor starts each class with a business example or problem designed to reinforce concepts in the reading assignment. Students attempt to apply the concepts learned in the reading to analyze and solve the sample business problem. Give-and-take discussions fill the remainder of the meeting time. Having both engineering and business students leads to a broad cross-section of opinions and proposed problem solutions.

The central theme of the seminar is exploring, questioning, and attempting to understand the underlying causes of why some companies (both large and small) grow strong and powerful, while others wither and die. How do companies, products, technologies, innovators, and entrepreneurs succeed and fail in the global marketplace? How did General Motors, once the richest and most powerful car company in the world, get into such trouble? How did the Google

guys become insanely wealthy? How did Steve Jobs steer an ailing and faltering Apple Computer away from almost certain failure to the wildly successful company it is today?

The various business concepts that are touched on include:

- Market and competition analysis
- Business growth models
- Value propositions and value networks
- Opportunity discovery and analysis
- Market forces, trends, and disruptions
- Market gap and market niche identification
- Money, leverage, and resource allocation
- Intellectual property management
- Behavioral psychology (applied to why customers buy)

Granted, the seminar barely scratches the surface the topics above, but that brief introduction is usually sufficient to convince students that the business world is filled with wonderfully exciting things that can and do happen.

Roughly half way through the quarter, students propose topics on which they would like to do a business case study (actually, a limited-scope case study). The class usually proposes several dozen topics about specific entrepreneurs, companies, or products. The number of topics is narrowed to the best six and students choose the topic they would like to work on (in teams of three students per team). During the ninth and tenth weeks, the student teams make oral presentations in class on their case study topics and findings.

Many of the engineers in the seminar are surprised to learn that great technology is only a part (and sometimes a very small part) of the road to commercial success. Many of the business students are surprised to learn that engineers are as interested in learning about the business world as they are. All of the students gain an appreciation of how challenging and complicated the business world really is, and how the solution of extremely complex business problems requires deep insights and prodigious imagination and creativity.

The objective of the seminar is not necessarily to teach or develop entrepreneurial skills, but rather simply to give students a brief taste of how exciting it can be to discover and pursue new business opportunities, with the hope they might develop an appetite and take additional courses in business or entrepreneurship. The *Rocket Fuel Seminar* has been especially successful in enticing engineering students to complete minor degrees in business and/or entrepreneurship in the College of Business at Ohio State.

### **Student Experiences, Attitudes and Outcomes**

The vast majority of students taking the *Rocket Fuel Seminar* had no prior exposure either to business subjects in general or to entrepreneurship in particular, other than an occasional student with a parent or relative who owned a family business. On the other hand, most students harbored intense curiosities about entrepreneurship and quite a few had the desire (or fantasy, if

you will) to either start their own company or join an early-stage venture at some point in their careers.

At the end of the seminar, each student completes a 15 question survey designed to measure attitudes and outcomes as a result of taking the seminar. Each question in the survey is answered on a standard 1 "strongly disagree" to 5 "strongly agree" scale. Some of the survey questions involve course administration and housekeeping issues that do not directly relate to the subject of this paper.

One question that captured student attitudes was: "I would recommend this seminar to other students." The response to this question, averaged over all classes, was:

Question	Average	% Agree
I would recommend this seminar to other students.	4.42	92.8%

This seems to indicate that the students who took the seminar not only thought what they learned was worthwhile to them, but also would be useful to their peers.

Another question in the survey that was revealing was: "Participation in the seminar made me think about taking more courses in this area." The response to this question was:

Question	Average	% Agree
Participation in the seminar made me think about taking more courses in this area.	4.15	84.1%

Another indication of the outcome of the seminar was found in student's written Comment Boxes at the end of the survey, one of which was "What is the thing you liked most about the seminar?" Although the vast majority of responses were positive and insightful, a few selected responses to this question were:

- I didn't realize that it was so much fun to discover new business opportunities
- It made me want to find out more about what business is all about
- The class was very interesting and the idea of becoming an entrepreneur seems more exciting to me now than before taking the class
- I am thinking about doing an entrepreneurship minor
- I knew I wanted to be in business and this confirmed it
- I thought researching a company that I was interested in was a lot of fun
- I liked learning how innovators and entrepreneurs think

In summary, a one credit-hour seminar is an effective way to introduce first-year students to selected topics in innovation and entrepreneurship. We have found that students at the freshman level are very receptive to setting off on a brief tour to explore, question and discover new topics—such as innovation and entrepreneurship—that are totally outside the realm of their own experience, but could be very important in their future careers.

1. *Proceedings, 2003 ECI Conference on Teaching Entrepreneurship to Engineering Students*, Monterey CA, Engineering Conferences International Symposium Series, Ed. Eleanor Baum and Carl McHargue, online at <http://services.bepress.com/eci/teaching>.
2. Friedman, Thomas L., *The World is Flat: A Brief History of the Twenty-first Century*, Farrar, Straus and Giroux, April 2005.
3. Christensen, Clayton M., *The Innovator's Dilemma*, Harvard Business School Press, 1997, and Harper Business, 2000.
4. Moore, Geoffrey A., *Crossing the Chasm*, Harper Business, 1991.
5. Collins, James C., *Good to Great*, Harper Collins, 2001.